Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

.9
524W

LIBRARY
RECEIVED
★ SEP 10 1941 ★
U. S. Department of Agriculture

United States Department of the Interior
Fish and Wildlife Service

Wildlife Leaflet 193

Washington, D. C. * July 1941

DIRECTIONS FOR COLLECTING MATERIALS FOR FOOD HABITS STUDIES

Prepared in Section of Food Habits, Division of Wildlife Research

Contents

Page
Introduction 1
Equipment needed 2
Preparation of material for preservation 2
  Digestive or alimentary tract. 2
    Amphibians 2
    Reptiles 3
    Birds. 3
    Mammals. 3
  Pellets and droppings (scats) 4
Page
Preservation 4
  Procedure for stomachs and crops. 4
  Undetermined specimens . . 4
Records. 5
  Identification tags. . . . 5
  Use of symbols for vertebrate groups 6
  Schedules. 6
Supplementary reference material 7
Shipping 7

INTRODUCTION

Study materials poorly collected often result in a waste of time for all concerned; insufficient collection data, inadequate preservation, or other deficiencies may render specimens valueless. Compliance with recommended procedures will help prevent this needless waste.

Good collecting involves, among other things, skillful technique in handling, effective preservation, accurage and complete records, and submission of adequate supplementary reference materials to aid in the laboratory analysis.

Since collectors belong to two rather distinct categories as regards time, opportunity, and training, it would be unreasonable to impose a single standard for all returns. Biologists and the more or less professional collectors may be in position to make excellent and extensive collections and supply complete records, but game wardens, hunters, administrative officials of various Federal agencies, and others cannot be expected to furnish completed schedules, reference materials, and supplementary data. In every instance, however, there is a minimum of essential information and necessity for conforming to certain procedures.

EQUIPMENT NEEDED

Essential collecting equipment (aside from traps or firearms) includes--

Identification tags.
Carbon ink or lead pencil.
Preservative.

Additional supplies that may be needed are--

Pocket notebook.
Schedules.
Cheesecloth, or equivalent, for wrapping.
Plant press, insect net, and other accessory equipment.

Schedules and identification tags are furnished to qualified cooperators by the Fish and Wildlife Service, and in special instances plant presses and the like also. Further discussion of equipment is given under the sections dealing with its use.

PREPARATION OF MATERIAL FOR PRESERVATION

Digestive or Alimentary Tract

The digestive, or alimentary, tract includes the following:

Gullet, or esophagus.
Crop, a pouchlike enlargement of the gullet.
Stomach, the proventricular or glandular stomach and gizzard or grinding stomach in birds or the rumen or anterior stomach in mammals.
Intestine.

Amphibians.--Entire specimens of salamanders, frogs, toads, and other amphibians are acceptable. Separate portions of the digestive tract should not be submitted, since field identification of this group is unreliable and difficult. An identification tag should be firmly tied around one of the limbs and the whole specimen treated as prescribed under Preservation of undetermined specimens.

Reptiles.--It is well to save the entire digestive tract of reptiles. This should be folded into more or less symmetrical loops and enclosed in cheesecloth.

Birds.--In removing the stomach (gizzard) of birds, the intestine should be severed, and, if necessary to prevent loss of contents, tied with a strong cord. If the gullet (esophagus) or the enlargement of the gullet known as the crop (or craw) contains food, it should be removed along with the stomach; if not, it may be cut a short distance from the entrance to the stomach, leaving only a stub for convenience in attaching an identification tag. Though the contents should be kept intact and separate, a gullet or crop together with its corresponding stomach may be wrapped in a piece of cloth and tied by the identification-tag cord. This reduces loss of food materials and prevents confusion as to the identity of stomachs and crops.

If the identity of a bird is in doubt, the wings, head, and feet should be tied up in cheesecloth, given the same identification number as the stomach and gullet, and forwarded at the same time.

Mammals.--The stomach and other parts of the digestive tract of most mammals should be handled in the same manner as for birds, though it is often advisable to remove the intestine, if it contains food, along with the gullet and stomach, folding it into more or less symmetrical loops and wrapping all together in cheesecloth. The stomach and intestinal walls of large mammals should be slit in several places to admit the preservative unless a weak solution of commercial formaldehyde (1 to 20) is injected at several points. This treatment will probably be necessary to prevent spoilage of the stomach contents of bears and other large carnivorous mammals.

It is usually impracticable to save the entire stomach contents of deer, elk, moose, or other large herbivorous mammals, but some statement as to the actual or approximate quantity of material present should be made on the tag or on the schedule sheet. In such cases the anterior stomach, or rumen, should be opened and about a quart of the contents removed after the larger and more diagnostic bits of food have been picked out. Representative samplings should then be made from several points in the food mass or else the entire contents should be thoroughly mixed before removing the portion to be saved. The sample (washed thoroughly, if practicable) and the larger and more diagnostic fragments should be placed in a cheesecloth bag, or wrapping, in a weak formaldehyde solution. Samples may be dried for shipping or storage, but unless previously treated with a preservative, mold may develop.

Occasionally it is feasible to ship the stomach contents of ruminants direct to the laboratory in a thoroughly frozen condition, thus preserving in a fresh state any green vegetation that may be present.

Pellets and Droppings (Scats)

Pellets from owls and other birds, droppings (scats) from birds and mammals, and cheek-pouch material should preferably be collected as individual samples, but if taken in lots, special attention should be given to packing to insure against disintegration of individual units. Pellets gathered periodically from roosts or nests should always be collected individually and the approximate date of deposition indicated for each. They may be placed in small glassine or paper bags and stored in a dry, insect-proof container. Before being stored, however, all such material should be fumigated with carbon bisulfide to destroy insect pests, and naphthalene flakes or paradichlorobenzene crystals should be placed in the container. Inspections should be made periodically for signs of insect infestation.

Pellets and droppings should be collected for food-habits studies only when identification of the animal source is positive. Droppings from known dens or pellets from under known roosts or nests are the most acceptable, as certain determination can then usually be made.

PRESERVATION

Procedure for Stomachs and Crops

The most reliable and economical preservative for stomachs and crops is a solution of formaldehyde, although alcohol (70 percent) may be used for small passerine birds. Medium-sized stomachs and crops can be placed in a solution made by diluting commercial formaldehyde with 24 parts of water, those larger in one prepared with 12 to 15 parts of water, as a stronger preservative is necessary. As already stated, large stomachs and crops should be injected with the formaldehyde solution prior to being placed in it, or small slits may be made in the wall to insure immediate penetration of the preservative. This may necessitate wrapping in cheesecloth to prevent loss of contents.

Materials may be left in the preservative indefinitely. They may be shipped safely, however, only after 5 days.

In removing material from formaldehyde solution long forceps or rubber gloves should be used to protect the hands, as this preservative is irritating and tends rapidly to dry and shrivel the skin. Too much exposure of the eyes to the fumes may result in temporary obscuring of vision. Formaldehyde is a poison and should be treated as such.

Undetermined Specimens

When the identification of a collected specimen is uncertain, the entire animal, if it is small (as a frog, snake, or mouse), should be preserved. This can be done by injection of a commercial formaldehyde solution, diluted 1 to 24 for small specimens and 1 to 12 for larger ones. For the purpose a glass hypodermic syringe of 5 cc. capacity, equipped with needles 1 to 2 inches long, is useful. If the preservation of the entire animal is not feasible, the head, feet, and tail may be removed and wrapped with the stomach before being placed in the preservative. If the specimen is a bird, the wings also should be saved.

The larger injected specimens should always be immersed in the preservative with the injection holes upward to facilitate the escape of any gases that may form. The collection of these gases within the specimen, in pockets from which they cannot escape, frequently causes decayed spots in improperly preserved material.

RECORDS

Identification Tags

Each stomach or crop (or combination of stomach and crop) should be labeled with an identification tag of vulcanized fiber paper, which will be furnished to Service cooperators. Tags (paper or cloth) having starchy coatings should never be used, as the surface bearing the written legend readily washes off.

Of the two principal kinds of identification tags, the larger one (fig. 1) is intended for general use and is designed to record the most essential collection data, as follows:

Name and sex of animal.
Place.
Date collected.
Name of collector.
Serial number.

This large tag must always be used when materials are not accompanied by a schedule sheet of collection data and is suitable for wardens, hunters, and others who cannot conveniently undertake to supply information on separate paper (schedules). It also may be used advantageously, however, on collections accompanied by schedules.

The small tags (fig. 2) are to be employed only in conjunction with schedules. In general they are used by expert collectors handling large series of specimens. The minimum requirement of data on this tag is the collector's serial number and his initials; these should be written on one side of the tag in carbon ink and on the other side in lead pencil.

Experienced collectors frequently prepare a supply of the small tags in advance of use in the field, usually stringing in series on fine wire, a hundred or more marked with the collector's initials and current serial numbers.

Great care must be exercised in marking tags with collector's numbers or errors will result. For this reason most collectors should take the precaution of using the larger tag even though a schedule is submitted; thus, the inclusion of data additional to number and initials will reduce the likelihood of mistakes. Many veteran collectors find this procedure desirable.

Special large tags (fig. 3) bearing a printed form for the insertion of pertinent data have been supplied to predatory-animal hunters, and the system has worked effectively with a minimum of bookkeeping. Many thousands of stomachs labeled in this manner have been handled in the laboratory at Denver with few errors and with little loss of material.

Tags filled out in the field should be marked with a medium-soft lead pencil, never with indelible pencil or fountain-pen ink.

Use of Symbols for Vertebrate Groups

To save time in handling miscellaneous lots of gullets (crops) and stomachs, Service collectors use letters on tags to designate the various vertebrate groups. The letter "M," for instance, precedes numbers on all tags attached to mammal stomachs (fig. 1); similarly, the letter "B" is used to indicate the bird series; and the letter "H" (for herpetology) designates amphibian and reptilian material. In this system distinct series of numbers are used for each group and the data are recorded in separate catalogs. Bird, mammal, reptilian, and amphibian material should be recorded on separate schedules (fig. 4).

Schedules

Schedules of collection data are a valuable source of essential information. They should be prepared, if feasible, by anyone making extensive collections and they should invariably accompany material labeled with small tags. Data for schedules should be recorded in a pocket notebook at the time of collection, to prevent confusion and omissions. The following (as indicated in the sample schedule, fig. 4) are the chief points to be noted:

Collector's serial number. [1]
Name of animal (scientific, if known).
Sex and age.
Date of capture.
Hour of capture.
Collector's name.
Locality (state, county, and distance and direction from nearest town).
Character of place.
Remarks.

Comments on additional significant points, such as conditions under which the specimen was captured (shot, trapped, baited, or the like), may be included in the last column. Entries should be clear and neat.

---

[1] Each collector's numbers should form one continuous series and should not be repeated, regardless of the number of stomachs collected, the years or regions covered, or the special problems undertaken.

In addition to the essential data supplementary notes should be provided when time and opportunity permit, on environmental features that are likely to be important in food-habits studies. Information on the abundance and kinds of food locally available is likely to be a distinct aid in making laboratory determinations and interpretations.

SUPPLEMENTARY REFERENCE MATERIAL

Efficien food-habits collecting often includes the submission of supplementary reference materials (as plants, seeds, and insects, as these may be of great value in laboratory analyses. Even though laboratory reference collections may be large, there may be important deficiencies in the representation of the flora or fauna of certain localities or regions. These can best be met by collections of reference specimens made at the time and place that the stomachs, crops, or other food-habits study materials are obtained.

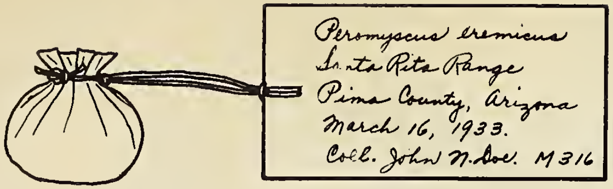
Information on reference collections of plants and on an arrangement, whereby good specimens (submitted in duplicate) will be identified, is contained in Fish and Wildlife Leaflet 3-1518.

SHIPPING

When stomachs and crops are to be shipped (or even moved from one locality to another in an automobile), they should be removed from the formaldehyde and permitted to dry until no longer wet on the surface. They may then be wrapped in heavy paper or cloth and sewed up in burlap or placed in a cardboard box that has been lined with a number of layers of newspaper or other absorbent material. Excess space should be filled with crumpled paper or excelsior. Burlap-covered bundles that do not leak can be shipped without additional packing, but a boxed package should be covered with an outside wrapper and firmly tied. Under no condition should tagged stomachs immersed in solution be transported, as the resultant agitation is likely to obliterate the writing on the tags.

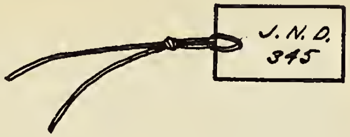
Stomachs or other material sent to the Service for food studies should be addressed to the Food Habits Laboratory, Patuxent Research Refuge, Bowie, Md., or to the Wildlife Research Laboratory, 546 Customhouse, Denver, Colo. In general big-game animals, predators, and certain small mammals collected west of the Mississippi River (or from the prairie region westward) are examined in the laboratory at Denver, and birds from all parts of the country (with a few exceptions), as well as eastern mammals, in the laboratory at the Patuxent Refuge.

Packages not exceeding 4 pounds in weight may be sent free by parcel post under frank by employes of the Service and by collaborators.



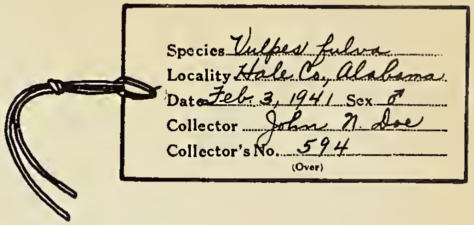
Peromyscus eremicus
Santa Rita Range
Pima County, Arizona
March 16, 1933.
Coll. John N. Doe. M316

FIGURE 1.--Large identification tag inscribed with essential data and attached to stomach wrapped in cheesecloth.



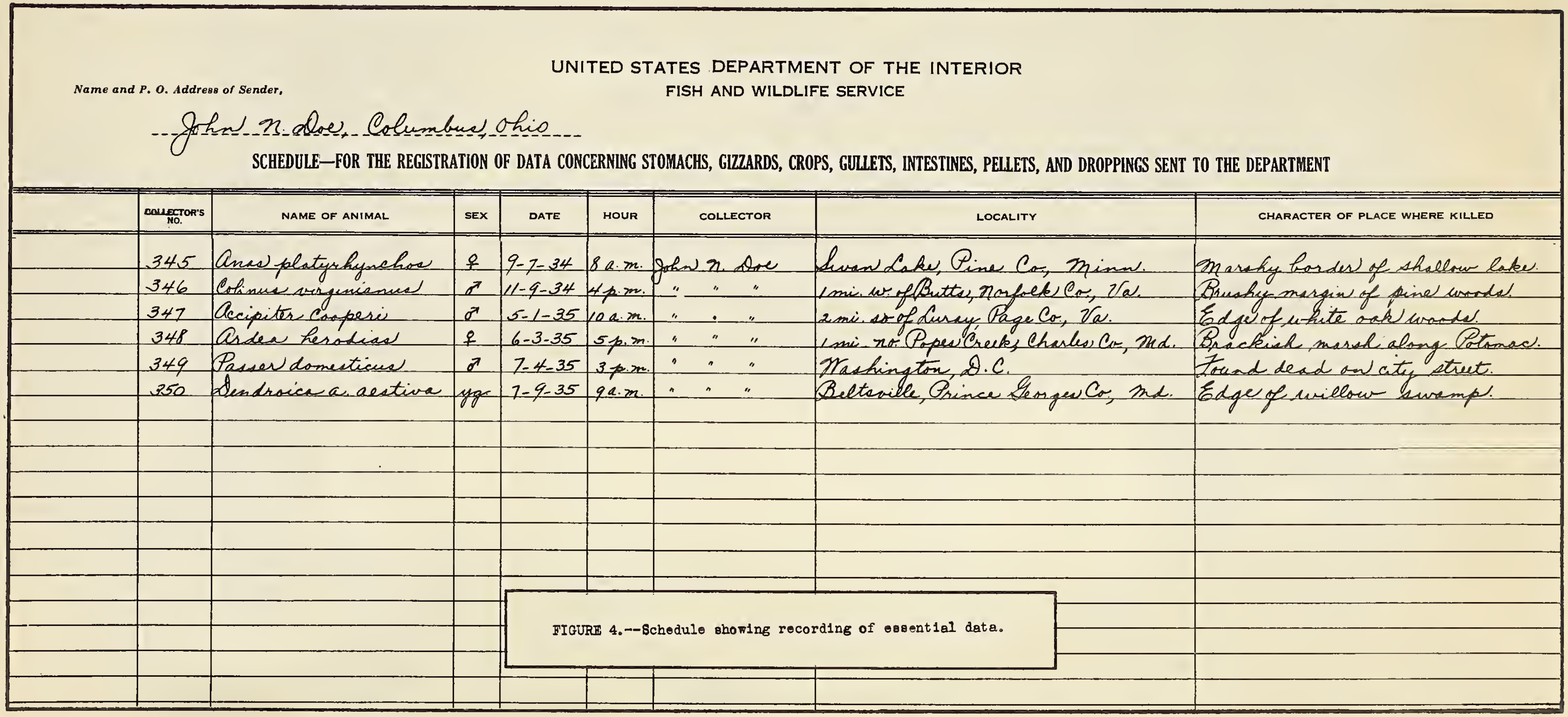
J. N. D.
345

FIGURE 2.--Small identification tag inscribed with collector's number and initials.



Species Vulpes fulva
Locality Hale Co, Alabama.
Date Feb. 3, 1941 Sex ♂
Collector John N. Doe
Collector's No. 594
(Over)

FIGURE 3.--Special identification tag with printed form.



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Name and P. O. Address of Sender,

John N. Doe, Columbus, Ohio

SCHEDULE—FOR THE REGISTRATION OF DATA CONCERNING STOMACHS, GIZZARDS, CROPS, GULLETS, INTESTINES, PELLETS, AND DROPPINGS SENT TO THE DEPARTMENT

	COLLECTOR'S NO.	NAME OF ANIMAL	SEX	DATE	HOUR	COLLECTOR	LOCALITY	CHARACTER OF PLACE WHERE KILLED
	345	Anas platyrhynchos	♀	9-7-34	8 a.m.	John N. Doe	Swan Lake, Pine Co, Minn.	Marshy border of shallow lake.
	346	Colinus virginianus	♂	11-9-34	4 p.m.	" " "	1 mi. w. of Butts, Norfolk Co, Va.	Brushy margin of pine woods.
	347	Accipiter Cooperii	♂	5-1-35	10 a.m.	" " "	2 mi. so. of Luray, Page Co, Va.	Edge of white oak woods.
	348	Ardea herodias	♀	6-3-35	5 p.m.	" " "	1 mi. no. Popes Creek, Charles Co, Md.	Brackish marsh along Potomac.
	349	Passer domesticus	♂	7-4-35	3 p.m.	" " "	Washington, D.C.	Found dead on city street.
	350	Dendroica a. aestiva	yg.	7-9-35	9 a.m.	" " "	Beltsville, Prince Georges Co, Md.	Edge of willow swamp.

FIGURE 4.--Schedule showing recording of essential data.